

Application No.: 09/892,543

Amendment Dated: October 30, 2003

Reply to Advisory Action of: October 22, 2003

**REMARKS**

Applicants respectfully request reconsideration of the application, as amended, in view of the following remarks. Applicants have introduced **new Claim 20** which will be discussed below.

The present invention as set forth in **Claim 1** relates to a method for producing an ethylene-vinyl acetate copolymer, comprising:

copolymerizing ethylene and vinyl acetate in an alcohol-based solvent, so as to form a solution containing said ethylene-vinyl acetate copolymer; and

recovering unreacted vinyl acetate from said solution after copolymerizing;

wherein said solution is introduced into a recovery column through an upper portion thereof, **a vapor of an alcohol-based solvent is introduced into said recovery column** through a lower portion thereof, a solution comprising ethylene-vinyl acetate copolymer is taken out of said recovery column through a lower portion thereof, and unreacted vinyl acetate in the solution is taken out of said recovery column with the vapor of the alcohol-based solvent through an upper portion thereof;

**wherein said alcohol-based solvent is deoxidized in advance and an oxygen concentration in said alcohol-based solvent is not more than 60 ppm when said alcohol-based solvent is used in recovering said unreacted vinyl acetate.**

In contrast, Blumberg et al (US 3,513,142) fail to disclose or suggest that **an oxygen concentration in said alcohol-based solvent is not more than 60 ppm when said alcohol-based solvent is used in recovering said unreacted vinyl acetate**. In Blumberg et al, the

Application No.: 09/892,543

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oxygen content of a monomer stream fed to the polymerization zone is removed (Blumberg et al, col. 2, line 60-col. 3, line 17). However, there is no disclosure of an oxygen content of a solvent used in the recovery of the monomer after the polymerization. The disclosure of Blumberg et al is based on the fact that the patentees discovered that acetaldehyde and similar impurities are not the sole reason for the for the **undesired coloration** of polyvinyl alcohols. They found that molecular oxygen present during the polymerization is responsible for the coloration (Blumberg et al, col. 2, lines 3-6, 35-41 and col. 4, lines 5-17). However, the inventors of the present invention have found that the oxygen contained in the alcohol-based solvent used when recovering vinyl acetate after the polymerization contributes to the **visible imperfections such as discoloration, fish eyes, rough surfaces** (specification, page 1, lines 9-15 and 30-32). Blumberg et al fail to disclose an oxygen content in methanol used in the recovery process and the influence of the oxygen contents on the color of the EVOH product. All they state is that the amount of coloration found in the polyvinyl alcohol will depend in large part upon the extend to which the dissolved oxygen is **removed from the feeds to the polymerizer** (Blumberg et al, col. 4, lines 43-46).

The methanol used in the recovery process has no direct relationship with the production of the PVAc-based polymer. As claimed in Claim 1, a solution containing said ethylene-vinyl acetate copolymer is introduced into a recovery column and **a vapor of an alcohol-based solvent is introduced into said recovery column**. The fact that a material having no direct relationship with the polymerization affects on the physical properties (e.g., appearance) of the product has not been found until the present invention, and thus it is not

Application No.: 09/892,543

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obvious for any persons skilled in the art from the cited references.

Since vinyl acetate and methanol are deoxygenated before polymerization according to Blumberg et al, a person skilled in the art will not consider the effects of the oxygen content in methanol used in the recovery process on the oxygen contents in the vinyl acetate and methanol to be recovered and reused for polymerization.

In addition, **new Claim 20** relates to a method for producing an ethylene-vinyl acetate copolymer, comprising:

**copolymerizing ethylene and vinyl acetate in a first alcohol-based solvent, so as to form a solution containing said ethylene-vinyl acetate copolymer; and**

**recovering unreacted vinyl acetate from said solution after copolymerizing;**

**wherein said solution is introduced into a recovery column through an upper portion thereof, a vapor of a second alcohol-based solvent is introduced into said recovery column through a lower portion thereof, a solution comprising ethylene-vinyl acetate copolymer is taken out of said recovery column through a lower portion thereof, and unreacted vinyl acetate in the solution is taken out of said recovery column with the vapor of the second alcohol-based solvent through an upper portion thereof;**

**wherein said second alcohol-based solvent is deoxidized in advance and an oxygen concentration in said second alcohol-based solvent is not more than 60 ppm.**

In Claim 20 it has been further clarified that the solvent used in the recovery process has no direct relationship with the production of the PVAc-based polymer. The solvent used in the recovery is the second alcohol based solvent. Blumberg et al fail to disclose or suggest

Application No.: 09/892,543

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Reply to Advisory Action of: October 22, 2003

the use of a second solvent during the recovery process which has been deoxidized. In addition a **comparison between Examples 1 and 2 and Comparative Example 1** of the specification shows that when the solvent used during the recovery is deoxidized (Examples 1 and 2 with oxygen concentration of 10 and 20 ppm), a white product with a low yellow index of 9 and 13 was obtained. On the other hand, in Comparative Example 1, the methanol fed to the recovery column was not deoxidized (oxygen concentration of 80 ppm) and a yellowish product with a yellow index of 20 was obtained. Thus, **the use of the deoxidized solvent in the recovery process results in a superior product.** This is not disclosed or suggested by the reference.

Therefore, the rejection of Claims 1-15 under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Blumberg et al (US 3,513,142) and the rejection of Claims 16-18 under 35 U.S.C. §103(a) as being unpatentable over Blumberg et al (US 3,513,142) are believed to be unsustainable as the present invention is neither anticipated nor obvious and withdrawal of these rejections is respectfully requested.

With regard to withdrawn Claim 19, Applicants note that Claim 19 depends on Claim 4. Thus, if Claim 4 is allowable, Claim 19 should be allowable as well.

Application No.: 09/892,543  
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Applicants submit that the present application is now in condition for allowance and early notice of such action is earnestly solicited.

Respectfully submitted,

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